

REMARKS¹

In the outstanding Office Action, the Examiner rejected claims 2 and 3 under 35 U.S.C. § 112, second paragraph; rejected claims 1-4 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,596,607 to Ahn ("Ahn") in view of that which the Examiner has characterized as Applicants' Admitted Prior Art ("AAPA"); and rejected claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Ahn in view of AAPA, and further in view of U.S. Patent No. 6,191,002 to Koyanagi ("Koyanagi").

By this amendment, Applicant has amended claims 1-3, and canceled claim 5. Claims 1-4 are now pending in this application.

I. Rejections under 35 U.S.C. § 112, second paragraph

Regarding the rejection of claims 2 and 3 under 35 U.S.C. § 112, second paragraph, the Examiner asserts that claims 2 and 3 are indefinite because "it is not clear to the examiner whether the silicon oxide recited in claims 2 and 3 is a new additional layer or the same oxide film or layer recited in claim 1." Office Action, page 2. Although Applicants do not necessarily agree with the Examiner's assertion, Applicants have amended claims 2 and 3 to address the Examiner's concerns. Accordingly, Applicants submit that claims 2 and 3 are in conformance with the second paragraph of 35 U.S.C. § 112. Applicants therefore respectfully request that the Examiner withdraw the rejection of claims 2 and 3 under 35 U.S.C. § 112, second paragraph.

¹ The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement of characterization in the Office Action.

II. Rejections under 35 U.S.C. § 103(a)

Applicants initially note that the rejection of canceled claim 5 is moot. Moreover, Applicants respectfully traverse the rejection of claims 1-4 under 35 U.S.C. § 103(a) because a *prima facie* case of obviousness has not been established. To establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element recited in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must “ be found in the prior art, and not be based on applicant’s disclosure. ” See MPEP § 2143, 8th Ed. (Rev. 4), October, 2005. A *prima facie* case has not been established because, at a minimum, the references fail to teach or suggest each and every element of claims 1-4.

For example, Ahn fails to teach or suggest a combination including at least “removing said film ... by performing a chemical mechanical polishing (CMP) process,” and “after removing said film [by performing a CMP process], heating said residue to remove impurities for densification,” as recited in claim 1. The Examiner asserts that Ahn teaches “removing said film of the silicon oxide film (119), except for a residue of silicon oxide (removing an upper part of the oxide layer) remaining inside said device isolation trench.” Office Action, page 3. To the extent that first buried oxide layer 119 can reasonably correspond to Applicants’ claimed “silicon oxide film,” Ahn teaches “the first buried oxide layer 119 can be recessed by a wet etching process.” Ahn, col. 4,

lines 36-37 (emphasis added). Ahn thus teaches that first buried oxide layer is recessed, or has a portion removed, by a wet etching process. Ahn is silent as to using a CMP process. Therefore, Ahn cannot teach or suggest “removing said film ... by performing a chemical mechanical polishing (CMP) process,” as recited in claim 1 (emphasis added), and certainly cannot teach or suggest “after removing said film [by performing a CMP process], heating said residue to remove impurities for densification,” as also recited in claim 1.

AAPA fails to cure the deficiencies of Ahn. AAPA teaches that a polysilazane silicon oxide film is formed from a coat of a silazane perhydride polymer solution, in which a solvent from said coat is vaporized, and then, the silicon oxide film is formed by subjecting the coat to chemical reaction (a vaporization process), and finally, the impurities are removed by heating for densification (a densification process). See, e.g., Applicants’ specification at page 1, line 33 - page 2, line 6. AAPA, however, further teaches “the silicon oxide 4 is densified, then planarized by removing undesired portions using CMP process.” Applicants’ specification, page 3, lines 18-19 (emphasis added). That is, AAPA teaches performing a densification process, then performing a CMP process. AAPA thus cannot teach or suggest “after removing said film [by performing a CMP process], heating said residue to remove impurities for densification,” as recited in claim 1 (emphasis added).

Although not cited in the rejections of claims 1-4, the Examiner cited Koyanagi in the rejection of now-canceled claim 5 at page 5 of the Office Action for allegedly teaching “it is well known in the art to polished [sic] by a CMP process a silicon oxide (4) formed by a heat treatment of the coat of a silazane perhydride polymer solution (7).”

Koyanagi, however, cannot be relied upon by the Examiner to cure the above-noted deficiencies of Sato and AAPA. Koyanagi teaches:

substrate 1 having the SiO₂ film 4 thus obtained is placed in an inert atmosphere of the electric furnace held at 900° C for 60 minutes, thereby removing impurities such as excessive ammonia and water from the film ... [and] film 4 is further densified." Koyanagi, col. 8, lines 54-59 (emphasis added).

Koyanagi then teaches "[s]ubsequently, the SiO₂ film 4 ... is polished by a CMP process." Koyanagi, col. 8, lines 61-63 (emphasis added). Koyanagi thus teaches performing a CMP process after performing a densification process. Koyanagi thus also fails to teach or suggest "after removing said film [by performing a CMP process], heating said residue to remove impurities for densification," as recited in claim 1 (emphasis added), and could not be relied upon by the Examiner to cure the deficiencies of Ahn and AAPA.

For at least the reason that Ahn and AAPA fail to teach or suggest every element recited in claim 1, a *prima facie* case of obviousness has not been established with respect to claim 1. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claim 1 under 35 U.S.C. § 103(a).

Claims 2-4 depend from claim 1, and thus require all of the elements recited in claim 1. Because Ahn and AAPA fail to teach or suggest every element recited in claim 1, that combination of references also fail to teach or suggest every element required by claims 2-4. Therefore, a *prima facie* case of obviousness has not been established with respect to claims 2-4. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claims 2-4 under 35 U.S.C. § 103(a).

Applicants respectfully request that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner, placing claims 1-4 in condition for allowance. Applicants submit that the proposed amendments of claims 1-4 do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner, since all of the elements and their relationships claimed were either earlier claimed in the claims as examined. Therefore, this Amendment should allow for immediate action by the Examiner.


In view of the foregoing remarks, Applicants submit that this claimed invention, as amended, is not rendered obvious in view of the prior art references cited against this application. Applicants therefore request the entry of this Amendment, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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